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# COMMUNICATIVE BEHAVIOR OF MOTHERS OF STUTTERING AND NONSTUTTERING HIGH-RISK CHILDREN PRIOR TO THE ONSET OF STUTTERING

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This portion of a multiyear prospective study was designed to investigate the communicative style, speaking rate, and language complexity of 93 mothers of preschool children with a parental history of stuttering. At the initial session none of the children sampled was regarded as being a stutterer. One year later, 26 of the children were classified as stutterers. Statistical analyses revealed that *prior* to the onset of stuttering the mothers of these children did not differ from the mothers of the children who continued to be seen as nonstutterers with respect to either communicative style or speaking rate. The only significant difference between the two groups of mothers was the complexity of their language. The pre-onset mean lengths of utterance (MLUs) of the mothers of children who later came to be regarded as stutterers were significantly shorter than those of the mothers whose children continued to be viewed as being fluent. These findings suggest that the communicative behavior of mothers of normally fluent children do not contribute to the development of stuttering.

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## INTRODUCTION

Various theorists have taken an interactionistic position with regard to the etiology of stuttering (e.g., Bloodstein, 1987; Brutten & Shoemaker, 1967; Starkweather, 1987; Van Riper, 1982). They have proposed that both en-

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vironmental and organic factors influence susceptibility to stuttering. However, interactionist theorists have differed regarding the amount of variance explained by each of these factors and their predisposing, eliciting, and maintaining role.

With respect to environmental factors, special interest has traditionally been given to the relationship between the communicative behavior of parents and their children's speech disruptions. A basic assumption has been that the negative and demanding attitude that parents may display with regard to their child's communicative behavior induces negative emotion that makes their offspring more vulnerable to speech disorganization. This posited relationship between parental behavior and fluency failure has had a notable influence on clinical practice (e.g., Peters & Guitar, 1991; Starkweather, Gotwald, & Halfond, 1990; Wall & Meyers, 1984). Many programs for treating preschool stutterers involve modification of parent-child verbal interactions (Egolf et al., 1972; Guitar et al., 1992; Stephenson-Opsal & Bernstein Ratner, 1988). Specifically, clinicians advise parents to use shorter and less complex syntax, and to slow the rate of their speech and turn-taking (Conture, 1990; Nelson, 1986).

Attempts to study the relationship between the communicative behavior of parents and stuttering in their children have included the use of conversational analysis. In this regard, Kasprisin-Burelli, Egolf, and Shames (1972) and Mordecai (cited in Meyers & Freeman, 1985c) found that parents of stutterers displayed more negative verbal interactions and interrupted their child more frequently than did parents of nonstutterers. Mothers of stuttering children also were found to make more use of demands, requests, and commands (Langlois, Hanrahan, & Innouye, 1986) and to talk faster than mothers of nonstutterers (Meyers & Freeman, 1985a).

Conversational analysis has not, however, consistently led to the finding of dyadic differences between the parents of stuttering and nonstuttering children. Meyers and Freeman (1985b, 1985c), for instance, found that mothers of stuttering and nonstuttering children did not differ significantly from each other in either the number of negative statements or in the frequency with which they interrupted their children. In addition, Weiss and Zebrowski (1991) failed to find between-group differences in the conversational assertiveness or responsiveness of parents of stuttering and nonstuttering children. Moreover, Kelly and Conture (1992) failed to find a difference in the speaking rates, mean length of utterance, and interrupting behaviors of mothers of stutterers and nonstutterers.

The equivocal nature of the data that has resulted from studies employing conversational analysis makes it hard to draw a clear-cut conclusion regarding the influence of parental communicative behavior on the fluency failures of children who stutter. In part, this may be because of the amalgam and high number of dependent variables, the low sample sizes, and

the selection of parent-child dyads that involve children who are in therapy for stuttering. In part, also, it may be because in these studies gender-related parent-child interactions have not been considered. This despite the fact that theorists who take an environmental position often assume the existence of a cultural difference in the treatment of the sexes. This is exemplified by Johnson and associates (1959), who hypothesized that a difference exists in the manner in which parents perceive, evaluate, and react to hesitations in the speech of boys and girls. Similarly, Goldman (1967), among others, has assumed that there are greater environmental pressures on the male than on the female child. To the extent that differences of this kind exist, the variability in the aforementioned studies should have been limited by controlling the gender of the children.

But, even if the available studies had clearly shown the existence of an association between parental communicative behavior and stuttering in children, they would not have provided evidence that the former is associated with its emergence. This could only be addressed through prospective studies. It was the need for an investigation of this kind that led to a three-year study of the communicative behavior of mothers of young children whose fluency was considered to be at risk because of a parental history of stuttering. One of the objectives of this investigation was to assess the communicative style, speaking rate, and language complexity of sampled mothers and to compare the behavior of those mothers whose children later become stutterers with those whose children do not. Another objective of the study was to explore the relationship between the gender of the at-risk children and the communicative behavior of their mothers. The current report presents data from the first year of this multiyear investigation.

## METHODS

### Subjects

The subjects of this study were 93 monolingual Dutch-speaking mothers and their preschool children. The mothers who participated in this prospective study were selected because they and/or their husbands had a history of stuttering. Of the 93 mothers, 28 were diagnosed stutterers. The remaining 65 mothers each had a husband who had been diagnosed as a stutterer. The mothers were brought to the attention of the experimenters by area pediatricians (36%), members of the Dutch Association of Stutterers "Demosthenes" (23%) and by speech-language pathologists (41%). These mothers were naive as to the purpose of this study.

The 93 children (45 boys and 48 girls) sampled were between the ages of 23 and 58 months ( $M = 39.0$  months,  $SD = 9.0$  months) at the onset of this investigation. Both their pediatrician and their parents reported them



to have normal intelligence and to be normally developing children. All of the participating children had demonstrated that they functioned within age-related normal range for receptive and expressive language (Kloth et al., 1995). And, each of the participating children passed a pure-tone audiometric hearing screening test.

At the beginning of this prospective study, none of the 93 children were thought by their parents to be stutterers. In addition, no stuttering forms of speech disruption were observed by the experimenters at the time the children were first evaluated. However, at the follow-up session one year later, 26 children met the present criteria that led them to be classified as incipient stutterers. Specifically, both parents had to regard their child as a stutterer and had to indicate on the Disfluency Questionnaire (Kloth, Jansen, & Kraaimaat, 1989) that stuttering forms of speech disruption had often or very often been evidenced at home during the previous two months.<sup>1</sup> The parents of the remaining 67 children neither viewed them as stutterers nor reported the presence of stuttering disfluencies. They continued to be seen as normally fluent children. The mothers of these 67 children served as the control group in this study. The experimental group consisted of the 26 mothers whose children had developed stuttering during the year under study.

## Procedure

Data collection during the initial test session and in the follow-up one year later took place at the Department of Phoniatics of the University Hospital of Utrecht. Two rooms separated by a one-way mirror were used. The subjects' room contained a selection of age-appropriate toys (e.g., telephones, a bucket with small toys, a Fisher-Price farmhouse, a tea set), a Sony TC-158SD audiotape recorder, and a Grundig LC-290H video camera. In the observation room there was a Philips VHS videorecorder (Type HQ-VR-722), a JVC color video monitor (type TM-210PS-K), and a remote control for the video camera.

Each of the mothers, whose interactions were videorecorded during 30 min of free play with their children, was instructed to converse and play with her child as she would at home. Ten minutes of each of these conversations were transcribed by a trained coder. The transcription began at the third minute of videotaping to allow for a 2-min long "warm-up" period. Later, the transcribed conversations were separated into utterances using

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<sup>1</sup> This 10-item questionnaire measured on a five-point Likert scale that ranged from never to very often, the extent to which normal (5 items), borderline (2 items), and stuttering-type disfluencies (3 items) were displayed at home.

the Golinkoff and Ames (1979) criteria, in which an utterance is defined as a string of words that communicates an idea, are bound together by one breath, are intended to be continuous, and are separated by pauses longer than one second. The transcriptions were checked by two judges. When there was disagreement about an utterance, it was removed from the sample.

## Data Analysis

**Communicative Style.** Each of the mother's transcribed utterances was analyzed in accord with a pragmatic instrument (Kloth, Kraaimaat, & Jansen, 1993) that was based on ethnomethodology (Garfinkel, 1974; Sacks, Schegloff, & Jefferson, 1974) and speech act theory (Austin, 1962; Searle, 1969). This instrument made it possible to assess the mother's communicative interaction with her child on two levels. The first level, which relates to structural organization, has reference to the amount of speech and mean length of turns, the mean duration of pauses within and between turns, and the frequency with which the mother interrupted her child. The second level involves the assessment of the communicative function of the mothers' speech. As such, the utterances were coded based on their communicative intent regardless of syntactic structure. This taxonomy included communicative functions, such as commenting, making requests, and providing information, praise, commands, and warnings.

Previous research involving principal component analysis has shown that the communicative behaviors of mothers, as they talk with their child, factored into three styles. These were labeled non-intervening, explaining, and directing (Kloth, et al., 1993). The loading for the non-intervening communicative style included total number of speaking turns, monologuing, mean duration of inter- and intra-speaker pauses, requests for information, and affirmatives. A high score on this style was seen as reflecting a communicative pattern in which there is no direct pressure from the mother for the child to respond verbally. The explaining communicative style brought together the total number of syllables, monologuing, mean duration of intra-speaker pauses, total number of interruptions and overlaps, labeling, information giving, and yes-no questions. It paints the picture of a mother who is primarily concerned with providing information to her child in a way that gives the child little opportunity to take over or hold the speaking turn. The directing communicative style was comprised of commands and warnings, attention devices, negations and criticisms, repairs, and reflective questions. It is primarily descriptive of a mother who is mainly engaged in directing her child's behavior by means of verbal control.

The individual non-intervening, explaining, and directing style score for each of the mothers studied was first transformed into z-scores. Subse-

quently, the separate z-scores belonging to each of the three communicative styles were summated.<sup>2</sup>

**Speaking rate.** In order to assess the mothers' speech rate, an acoustical temporal analysis was performed on 10 clearly audible and perceptually fluent utterances of each mother during spontaneous speech. For each mother, three 6-syllable utterances, four 7-syllable utterances, and three 8-syllable utterances were selected. The selected utterances were recorded at a sampling rate of 10 kHz and were displayed as a time waveform with a duration of 10 s. Each utterance was measured from the onset of the periodic waveform of the first vowel or voiced consonant to the offset of the periodic waveform of the last vowel or voiced consonant. The simultaneous playback of the audio signal facilitated the identification of the onset and offset of the periodic waveform. The absence of spectral energy between two words within an utterance that exceeds 250 ms was defined as pause duration. Durational measures in milliseconds were automatically calculated by the software following the position of the cursors on the waveform.

The number of syllables within a measured utterance was also determined. Speaking rate was calculated by dividing the duration, inclusive of pauses, by the number of syllables. These values were converted to syllable rate per second. The means and standard deviations of the utterance durations across the 10 sampled utterances were then computed for each subject. From these data the mothers' mean speaking rate was derived.

**Language complexity.** Mean length of utterance (MLU) served as the measure of the mothers' language complexity. MLU was determined by dividing the total number of words in the 10-min sample of mother-child communication by the total number of utterances. Words were counted according to Brown's rules (1973). One-word utterances, fillers, stereotypical phrases, counting, and singing were not considered in the analysis.

## Reliability

Interjudge reliability of the pragmatic instrument in the scoring of the structural organization and the communicative functions was assessed by having two trained judges analyze 20 randomly chosen 10-min samples of the mothers' speech. The initial determination made by the senior author was compared with that of an independent examiner who was a graduate student in speech-language pathology. The Kappa agreement index obtained was  $+ .89$ .

Interjudge reliability of speaking rate was determined from a random

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<sup>2</sup> For more details about the psychometrics of the pragmatic instrument, see Kloth et al. (1993).



sample of 5% of the initial measurements. Specifically, 50 utterances were re-measured by a judge who was a graduate student in phonetics. A Pearson's product moment correlation applied to the rate measures of the two judges revealed a coefficient of  $+ .92$ .

## RESULTS

The mean age of the 26 mothers whose children showed signs of stuttering one year after the onset of the study (i.e., experimental group) was 33.3 years ( $SD = 4.9$ ). The mean age of the 67 mothers whose children, at the time of the follow-up, continued to speak in a normally fluent fashion (i.e., control group) was 31.10 years ( $SD = 4.1$ ). The two groups of mothers did not differ significantly with respect to age ( $t = 1.19$ ;  $p = .24$ ).

The experimental group contained 10 mothers who stuttered and 16 who did not. In the control group 18 mothers were stutterers; the remaining 49 mothers were considered to be nonstutterers. There were no significant differences in the number of mothers who stutter in the two groups ( $\chi^2 = 1.23$ ;  $p = .26$ ).

The educational level of the mothers in the experimental and control groups was assessed by means of a 5-point Likert scale ranging from primary school to university. No significant difference in the educational level of the two groups was found ( $\chi^2 = 1.96$ ;  $p = .38$ ). In addition, the two groups did not differ with respect to either the age ( $t = .34$ ;  $p = .74$ ) or the gender of their children ( $\chi^2 = 2.5$ ,  $p = .11$ ). In the experimental group, 16 of the children were male with a mean age of 3 years and 5 months, and 10 were female with a mean age of 3 years and 1 month. The control group consisted of 29 boys (mean age 3 years and 6 months) and 38 girls (mean age 3 years and 2 months).

Table 1 presents the pre-onset means and standard deviations specific to the communicative style, speaking rate, and language complexity of both the mothers whose children came to be viewed as stutterers and those who did not.

To test for statistically significant differences between the groups, each dependent measure (i.e., communicative styles, speaking rate, and language complexity) was analyzed by means of a two-factor analysis of variance. Because the sample sizes were unequal, a regression approach (SPSS, Tabachnick & Fidell, 1989) was used. And, because age of the children was found to correlate significantly with both directing style ( $r = -.24$ ;  $p < .01$ ) and MLU ( $r = +.36$ ;  $p < .01$ ), it was used as covariate in the analyses of these variables.

As indicated, one factor represented the classification of the child as either a stutterer or a nonstutterer. The other factor represented gender. The results of the two-factor analysis of variance (ANOVA) are shown in Table 2.



**Table 1.** Means and Standard Deviations for Communicative Style, Speaking Rate, and Language Complexity of the Mothers of Normally Fluent Children Who on Follow-up, a Year Later, Were Viewed as Stutterers or as Nonstutterers

	Mothers of children regarded as stutterers				Mothers of children regarded as nonstutterers			
	Male ( <i>n</i> = 16)		Female ( <i>n</i> = 10)		Male ( <i>n</i> = 29)		Female ( <i>n</i> = 38)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Communicative style*								
Non-intervening	0.77	4.16	−1.14	4.65	−0.02	4.15	−0.35	3.48
Explaining	−0.37	4.50	−0.76	2.19	0.59	2.31	0.23	4.10
Directing	−0.86	2.61	2.11	3.58	0.05	2.84	−0.49	2.89
Speaking rate								
Speaking rate	5.78	0.76	5.77	0.40	5.71	0.55	5.83	0.66
Language complexity								
MLU	4.94	0.59	4.54	0.83	5.29	0.63	5.02	0.58

\* z-scores

The between-group *F*-values shown in Table 2 indicate that, at the time of the initial contact, when all of the children were considered to be normally fluent, the mothers of those who at follow up, one year later, were considered to be stutterers only differed significantly from the mothers of the children who continued to be seen as nonstutterers with respect to their language complexity. More specifically, the mothers of the stutterers had significantly shorter MLUs,  $F(1, 89) = 7.07, p < .01$ , than the mothers of the children later seen as nonstutterers. They were not discernably different regarding either their style of communicating with their children or the speed with which they spoke to them.

With respect to communicative style and speaking rate, similar findings were obtained for gender. As the *F*-values in Table 2 indicate, the main effect for the childrens' gender was not found to be statistically significant. In addition, the mother's language complexity did not differ significantly for the sexes. Thus, contrary to what might have been expected given past assumptions, the mothers did not communicate with their sons in a notably different way then they did with their daughters.

The only significant interaction effect found was the group-by-gender interaction for the directing communicative style,  $F(1, 89) = 7.07, p < .01$ . In order to explore this interaction effect, a post hoc Newman-Keuls test was performed. This analysis revealed a significant difference ( $p < .01$ ) between the communicative style of the mothers prior to the time some of their daughters came to be seen as stutterers and others did not. During initial experimental session, the mothers of the girls later viewed as stut-

**Table 2.** Two-Factor Analysis (ANOVA) for Groups (Mothers of Children who Came to be Viewed as Stutterers or Who on Follow-up Continued to be Seen as Nonstutterers), Gender of the Children, and Group by Gender Interaction

df	Two-way ANOVA <i>F</i> -values			
	Covariate	Group (1, 89)	Gender (1, 89)	Group × Gender (1, 89)
	Age (1, 89)			
Communicative style				
Non-intervening	—	0.01	0.85	0.72
Explaining	—	1.37	0.24	0.00
Directing	5.90*	0.56	0.01	7.07*
Speaking rate				
Speaking rate	—	0.01	0.41	0.18
Language complexity				
MLU	14.80*	7.07*	2.52	0.26

\* *p* < .01

terers displayed a communicative style that was more directing than that of the mothers of daughters whose speech at the time of the follow-up was not viewed as problematic.

DISCUSSION

This study of high-risk children represents an attempt to explore the possible relationship between maternal communicative behavior and the onset of stuttering. So far, experimental evidence on the association of certain maternal behaviors and the emergence of stuttering has come from studies comparing mothers of children who already stutter with mothers of non-stutterers. In the present study, data regarding the communicative style, speaking rate, and language complexity of the mothers of normally fluent, though high-risk, children were analyzed to determine if they could be used as predictors that would distinguish those who develop stuttering from those who do not.

The main result of this prospective study is that the communicative style and speaking rate of the mothers sampled did not show evidence of serving as factors contributing to the development of stuttering among children whose fluency is at risk. There were no statistically significant differences in either communicative style or speaking rate between the mothers of those children who later developed stuttering behavior and the mothers whose children continued to be viewed as nonstutterers. Only with respect to language complexity, as measured by mean length of utterance (MLU), did

they differ to an extent that exceeded chance. When first seen, the mothers of the children who were later considered to be stutterers displayed significantly less language complexity when communicating with their children than the mothers of the children who remained nonstutterers. This finding is opposite to that which would be expected if, as some theorists have suggested, the language complexity of parents makes a child more vulnerable to dysfluent speech (Starkweather, 1987).

The results relative to the sexes of the children also proved to be inconsistent with the theoretical position that parent-child relationships are gender related. At least with respect to the variables under study, there was not a significant gender effect for either communicative style, speaking rate, or language complexity. Mothers appear to interact with boys and girls in a similar way. Because in the present study one third of the mothers sampled considered themselves to be stutterers, it would not be unreasonable to speculate that this would influence the way they would verbally interact with their child. Previous research has suggested that adult stutterers are less skilled than are nonstutterers, especially in relation to regulating sequential and cooperative elements of the conversation (Krause, 1978; Richardson, 1984; Richardson & Brutten, 1983, 1984). Yet, post hoc analysis of our data by means of ANOVA revealed only one significant difference between the stuttering and nonstuttering mothers. The mothers who stuttered used a more explaining style. They monopolized the conversation. Seemingly, they were relatively unconcerned about their child's participation in the conversation.

The finding that the mothers who stuttered used a style that is more explaining than the mothers who did not stutter may be attributable to their difficulties with regulating conversation. If, then, the two groups of mother-child dyads studied differed significantly in the number of stuttering mothers, this might well confound the present finding that the communicative style of the mothers whose children came to stutter did not differ from those who continued to be normally fluent. This was not the case, however. The distribution of mothers who stuttered in the two dyads did not differ statistically ( $\chi^2 = 1.23$ ;  $p = .26$ ).

The finding that the mother's communicative style and speaking rate were not involved in the development of stuttering may be limited to at-risk children, that is, to children whose mother, father, or both had a history of stuttering. Possibly, the fact that the style and rate of the two groups of mothers did not differ was because they were well aware that communicative stress is not conducive to fluent speech. Thus, it is possible that the absence of a statistically significant difference in the pre-onset communicative behaviors of the mothers of stutterers and nonstutterers is a function of this knowledge and the resulting care that such parents take to avoid stressing their child communicatively. If this is indeed the case, the gener-



alizability of the conclusion that mother's communicative behavior does not play a crucial role in the onset of stuttering would be limited. It would be justified only with regard to mothers whose children are at risk because she and/or her husband stutters. On the other hand, an interactionistic model would suggest that if communicative stress is an influential factor in the onset of stuttering, it would likely be demonstrated among high-risk children. In any event, within the limits of the present study, the findings do not support the contention that communicative style and speaking rate are useful predictors of the onset of stuttering. It remains to be seen if other parental variables, ones not brought to test in this investigation, are associated with the emergence of stuttering.

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